

Patent claims:

1. Process for the preparation of enantiomerically enriched organic compounds in a coupled enzymatic reaction system, comprising a first enzymatic transformation of an organic substrate, NAD(P)H being consumed, and the regeneration of the NAD(P)H in a second enzymatic transformation by a malate dehydrogenase, with oxidation of L-malic acid to pyruvate and CO₂,
10 characterized in that the pyruvate formed from the second enzymatic transformation is not employed as the substrate in the first enzymatic transformation.
2. Process according to claim 1,
15 characterized in that the first enzymatic transformation proceeds using an alcohol dehydrogenase or amino acid dehydrogenase.
3. Process according to claim 2,
20 characterized in that an ADH from *Lactobacillus kefir* or *Rhodococcus erythropolis* is used as the alcohol dehydrogenase and a leucine dehydrogenase or phenylalanine dehydrogenase is used as the amino acid dehydrogenase.
4. Process according to one or more of the preceding
25 claims characterized in that a malate dehydrogenase from *E. coli*, in particular *E. coli* K12, is used.
5. Process according to one or more of the preceding
30 claims characterized in that the reaction is carried out in an aqueous single- or multi-phase solvent mixture.

6. Process according to one or more of the preceding claims,
characterized in that
the temperature during the reaction is between 20 and
5 40°C.
7. Process according to one or more of the preceding claims,
characterized in that
the pH during the reaction is between 6 and 9.
- 10 8. Coupled enzymatic reaction system for the preparation
of enantiomerically enriched organic compounds,
comprising a first enzymatic transformation of an
organic substrate, NAD(P)H being consumed, and the
regeneration of the NAD(P)H in a second enzymatic
15 transformation by a malate dehydrogenase, with
oxidation of L-malic acid to pyruvate and CO₂,
characterized in that
the pyruvate formed from the second enzymatic
transformation is not employed as the substrate in the
20 first enzymatic transformation.
9. Whole cell catalyst comprising a cloned gene for a
first enzyme for transformation of an organic
substrate and a cloned gene for a malate
dehydrogenase, this being capable of preparation of an
25 enantiomerically enriched organic compound in a first
enzymatic transformation, NAD(P)H being consumed, and
of allowing the regeneration of the NAD(P)H to take
place in a second enzymatic transformation by malate
dehydrogenase, with oxidation of L-malic acid to
30 pyruvate and CO₂, wherein the pyruvate formed from the
second enzymatic transformation is not employed as the
substrate in the first enzymatic transformation.
10. Plasmids containing gene constructs in which the gene
for a malate dehydrogenase and a gene for an enzyme

for transformation of an organic substrate with consumption of NAD(P)H are present.